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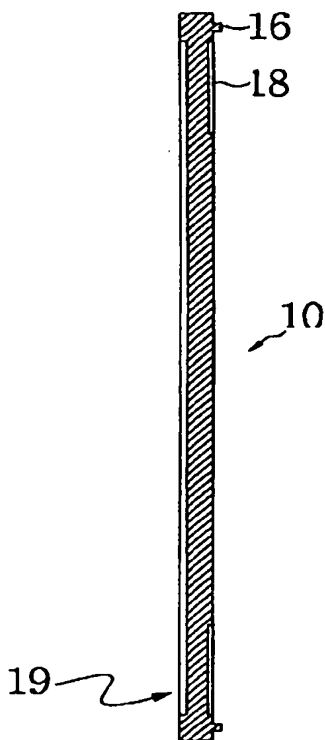
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(54) Title: CASINO CHIP WITH ANTITHEFT AND ANTIFORGERY TAG CIRCUIT AND MANUFACTURING METHOD THEREOF

(57) Abstract: Disclosed is a casino chip with an antitheft and antiforgery function and a method of manufacturing such chips. The casino chip is provided with an RF tag circuit which is capable of exposing an offender, by means of an electronic security system consisting of transmitters and receivers, when the offender steals authorized chips from a casino or wrongfully uses forged chips in the casino. The tag circuit (30) is not damaged because the tag circuit is protected by a preform (10, 20, 40,50) even though the preform comprising the thin tag circuit, which is susceptible to high temperatures, is subjected to an insert-injection molding step, thereby preventing theft of the casino chip.



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CASINO CHIP WITH ANTITHEFT AND ANTIFORGERY TAG CIRCUIT  
AND MANUFACTURING METHOD THEREOF

Technical Field

5       The present invention relates, in general, to a casino chip with an antitheft and antiforgery function and a method of manufacturing such chips and, more particularly, to a casino chip, which is provided with an RF tag circuit capable of exposing an offender, by means of an electronic security system consisting of transmitters and receivers, when the offender steals authorized chips from a casino or wrongfully uses forged chips in the casino.

10       Background Art

Currently, a non-contact electronic security system is widely used in various businesses such as stores and libraries, which can expose an offender by using a tag circuit located in wrappers or goods when the offender steals goods from a protected zone.

15       In a casino, coin-type plastic chips are used in a game instead of cash, 1000, 2000, 5000, 10000, 100000, 1000000, and 10000000 won are changed with each corresponding chip, and only chips should be used in the casino.

20       Because chips used in the casino may be worth up to 10000000 won, employees working in the casino have frequently stolen the chip. To prevent theft of the chip, separate entrances for employees have been set up in the casino, but robbery of the chip was not sufficiently prevented because the chip is small in size and it is difficult to expose the small chip. According to the present invention, the casino chip is provided with the tag circuit and the electronic security system is set up at entrances for employees, thereby preventing theft of the chip.

25

In addition, the forged or imitated chip may be in common use in the casino because the casino chips are valuable. According to the present invention,

however, the forged casino chip without the tag circuit or with an unauthorized tag circuit can be readily exposed by the electronic security system comprising a transmitter and a receiver, and which is located in a game table.

5 Meanwhile, the casino chip is generally made of plastics. Therefore, when the casino chip is subjected to an injection molding process, the tag circuit in the casino chip may be damaged due to high temperatures, and the tag circuit cannot be positioned in a center of the casino chip due to injection pressure during the traditional injection molding process because the tag circuit is thin and light. If the tag circuit is not positioned in the center of the casino chip, it cannot be  
10 sensed by the electronic security system.

Furthermore, the casino chip manufactured according to a conventional method makes it difficult to variously color the casino chips in order that they may indicate an amount of money, draw lines on a lateral side of the casino chip in order to easily identify the value of a chip when the casino chips are stacked, and  
15 draw a special design on a surface of the casino chip.

For convenience of use, the casino chip having a suitable weight is preferable, and so a core consisting of a heavier material than a main body of a casino chip is positioned in a center of the casino chip. However, it is difficult to draw lines on the surface of the casino chip with the tag circuit and insert the heavy  
20 material into the center of the casino chip, when using casino chips which have been manufactured according to the conventional method.

#### Disclosure of the Invention

Accordingly, the present invention has been made keeping in mind the above problems occurring in the prior art, and an object of the present invention is to produce a casino chip provided with a tag circuit consisting of an RF IC circuit  
25 located on the center of the casino chip, capable of exposing an offender, by means of an electronic security system positioned at entrances of a casino, when the offender steals authorized chips from the casino, thereby effectively preventing theft of the casino chip.

Another object of the present invention is to produce a casino chip provided with a tag circuit consisting of an RF IC circuit located at the center of the casino chip which is capable of exposing an offender, by means of an electronic security system located in a game table, when the casino chip not having the tag circuit or the casino chip having an unauthorized tag circuit is used in a casino, thereby forgery and imitation of the casino chip can be effectively prevented.

It is still another object of the present invention to provide a casino chip, which is made of plastics by an injection molding process, and which is provided with a thin tag circuit positioned in the center of a main body of the casino chip and so not damaged by high temperatures occurring in the injection molding process.

It is yet another object of the present invention to provide a casino chip, on a lateral side or a surface of which lines for indicating an amount of money or a special design can be readily drawn.

It is a further object of the present invention to provide a casino chip having a suitable and convenient weight which is manufactured by inserting a core consisting of a heavier material than a main body of the casino chip into the center of the casino chip.

#### Brief Description of the Drawings

The above and other objects, features and other advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a perspective view of a first preform according to the primary embodiment of the present invention;

Fig. 2 is a perspective view of a second preform according to the primary embodiment of the present invention;

Fig. 3 is a sectional view taken in the direction of the arrows substantially along the line A-A of Fig. 1;

Fig. 4 is a sectional view taken in the direction of the arrows substantially along the line B-B of Fig. 2;

Fig. 5 is a plan view illustrating an appearance of a tag circuit according to the primary embodiment of the present invention;

5 Fig. 6 is a plan view illustrating a resulting casino chip according to the primary embodiment of the present invention;

Fig. 7 is a sectional view of a first preform according to the second embodiment of the present invention;

10 Fig. 8 is a sectional view of a second preform according to the second embodiment of the present invention; and

Fig. 9 is a plan view illustrating a resulting casino chip according to the second embodiment of the present invention.

#### Best Mode for Carrying Out the Invention

15 The present invention provides a casino chip with an antitheft and antiforgery tag circuit, comprising a first preform provided with convex and concave parts formed in a saw tooth shape on the circumferential surface thereof, a position part formed as a groove along the circumferential edge thereof and located at a predetermined distance from the center of a combination side, and a cylindrical concave part located on a back of the combination side; a tag circuit located in the position part of the first preform; a second preform provided with convex and concave parts formed in a saw tooth shape on a circumferential surface thereof and a cylindrical concave part located on a back of a combination side, and combined with the first preform at the combination sides; and a final formed part covering the cylindrical concave part located on each preform.

20 In addition, the casino chip further comprises protrusions located on the combination side of the first preform and holes located on the combination side of the second preform.

25 Moreover, the casino chip further comprises a position part located on the combination side of the second preform.

Furthermore, the casino chip further comprises adiabatic members inserted into the position part located between each preform and the tag circuit.

Additionally, the casino chip further comprises packing members each inserted into a cylindrical space part located on the center of each preform.

5           According to the present invention, provided is a method of manufacturing a casino chip with an antitheft and antiforgery tag circuit, comprising the steps of preliminary injection molding preforms so that the preforms are combined with each other to form an integrated body; inserting a tag circuit into a position part located on each preform; combining the preforms having the tag  
10           circuits with each other; and insert-injection molding the combined preforms using a mold.

The method further comprises the step of inserting an adiabatic member on the position part of each preform after the preliminary injection molding step and before the inserting step.

15           The method is characterized in that a plurality of preforms engage with each other in the combining step.

Furthermore, according to the method of the present invention, a plurality of preforms are welded to each other by an ultrasonic wave in the combining step.

20           According to the present invention, provided is a method of manufacturing a casino chip with an antitheft and antiforgery tag circuit, comprising the steps of preliminary injection molding preforms so that the preforms are combined with each other to form an integrated body; inserting a tag circuit into a position part located on each preform; inserting the packing member into the space part of each preform; combining the preforms having the tag circuits and the packing  
25           member with each other; and insert-injection molding the combined preforms using a mold. Each preform has a space part capable of receiving a packing member and located on the center thereof, and the packing member is made of a different material from the preform.

30           The method is characterized in that the packing member is composed of substances selected from the group consisting of high specific gravity plastics, ceramics, glasses, and stone plates.

Furthermore, the method of the present invention is characterized in that the color of the preform produced by the preliminary injection molding step is different from that of the casino chip produced by the insert-injection molding step.

5           According to the method of the present invention, the tag circuit is located in the preform and the preform containing the tag circuit is subjected to the insert-injection molding step to produce the casino chip, and so the tag circuit is located at the center of the casino chip and not damaged by high temperatures occurring when the casino chip is being produced.

10           Reference should now be made to the drawings, in which the same reference numerals are used throughout the different drawings to designate the same or similar components.

          With reference to Figs. 1 to 4, two preforms 10 and 20 engage with each other, convex parts 12 and 22 and concave parts 14 and 24 are formed in a saw  
15   tooth shape on the circumferential surface of each preform 10 and 20, and plastics having a different color from the preform are coated on the concave parts 14 and 24 and the cylindrical concave parts 19 and 29 located on a non-combination side (an outer side) except for the convex parts 12 and 22 in a subsequent insert-injection molding step.

20           Protrusions 16 are formed on one preform 10 and holes 26 are formed on the other preform 20 so as to assemble the preforms 10 and 20 with each other at the combination sides of the preforms 10 and 20, and the number of the protrusions 16 and holes 26 is preferably two or more, respectively, to stably assemble the preforms 10 and 20 with each other.

25           Each position part 18, 28 consists of a groove along the circumferential edge of each preform 10, 20 and is located at a predetermined distance from the center of the combination side of each preform, and a tag circuit 30, as will be described later, is inserted into the position part. The depth of the position parts 18 and 28 is preferably determined in consideration of a thickness of the tag circuit  
30   30 so that the inserted tag circuit 30 does not protrude outside of the position part. Position parts 18 and 28 may be formed on any one of preforms 10 and 20. At



this time, it is preferable that the depth of each position part is deeper than the thickness of the tag circuit 30 so that the inserted tag circuit 30 does not protrude outside of the position part.

5 With reference to Fig. 5, the tag circuit 30 cooperating with a traditional electronic security system is illustrated. The tag circuit 30 is provided with an RF IC circuit 32, and a plurality of antennas 34 are positioned around the IC circuit 32.

The electronic security system is provided with a transmitter and a receiver, and thus RF (Radio Frequency) is transmitted from the transmitter in the electronic security system to the tag circuit 30, thereby the casino chip is sensed  
10 whether it is authorized or not. Therefore, when employees with the authorized casino chip pass through a doorway with the electronic security system, the casino chip is sensed by the electronic security system. Furthermore, when the unauthorized casino chip is used in the casino, the electronic security system positioned in a game table can sense it.

15 The preforms not molded are subjected to an injection molding step using a separate mold to produce preforms 10 and 20 each having a preferred shape.

As described above, the tag circuit 30 cooperating with the traditional electronic security system is illustrated in Fig. 5. In the inserting step of the tag circuit 30, tag circuits 30 are inserted into the position parts 18 and 28 of the  
20 preforms 10 and 20.

In the combining step of the preforms 10 and 20, after tag circuits 30 are inserted into the position parts 18 and 28 of the preforms 10 and 20, the two preforms 10 and 20 are combined with each other in such a way that the protrusions 16 engage with the holes 26.

25 Before the inserting step of the tag circuit 30 after the preliminary injection molding step, adiabatic members may be inserted into position parts 18 and 28 of preforms 10 and 20, thereby the injection molding can be more safely conducted because the tag circuit 30 is protected by the adiabatic member, and preforms can be combined by an ultrasonic wave without forming protrusions 16  
30 and holes 26 on preforms. Examples of materials of the adiabatic member include a Korean paper and a highly integrated styrofoam.

After combining of the tag circuit 30 is completed, combined preforms 10 and 20 are inserted into the mold, and subjected to the insert-injection molding step. Plastics are then fill the concave parts 14 and 24 of the preforms 10 and 20 and the cylindrical concave parts 19 and 20 located on the back of the combination side of preforms 10 and 20, as shown in Fig. 6, thereby manufacturing the coin-type casino chip according to the primary embodiment of the present invention.

According to the second embodiment of the present invention, another type casino chip is provided, which has a relatively heavy weight so as to facilitate handling and a high quality appearance.

Turning to Figs. 7 and 8, each preform is subjected to a preliminary injection molding step in such a way that space parts 42 and 52 capable of receiving packing members 60 made of different materials from the preform can be formed on the center of preforms 40 and 50, and packing members 60 are inserted into the space parts 42 and 52 located in the preforms 40 and 50 after the inserting step of the tag circuit 30 and before the combining step of the preforms.

The material of the packing member 60 is selected from the group consisting of high specific gravity plastics (at least 5 to 10 of specific weight), ceramics, glasses, and stone plates.

#### Industrial Applicability

As described above, the present invention provides a casino chip with an antitheft and antiforgery tag circuit and a method of manufacturing such chips. Therefore, the theft of an authorized casino chip is prevented because smuggling of an authorized casino chip is easily exposed, and forgery and imitation of the authorized casino chip can be prevented because use of the forged and imitated casino chip is also readily exposed.

According to the present invention, a tag circuit is not damaged because the tag circuit is protected by a preform even though the preform comprising the tag circuit which is susceptible to high temperatures is subjected to an insert injection molding step, and the casino chip having the tag circuit is readily sensed by an

electronic security system because the tag circuit is positioned at the center of the preform.

Furthermore, theft of the casino chip is effectively prevented because the tag circuit is completely coated with plastics and so the tag circuit cannot be removed from the casino chip without destruction of the casino chip.

Moreover, an injection molding step is conducted twice, and so various colors, lines and patterns can be drawn on the surface of the casino chip, thereby casino chips corresponding to various amounts of money can be manufactured.

In addition, the casino chip is convenient to handle and has a high quality appearance because a heavier material than the main body of the casino chip is inserted into the center of the casino chip.

Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

Claims

1. A casino chip with an antitheft and antiforgery tag circuit, comprising:  
a first preform provided with convex and concave parts formed in a saw  
tooth shape on a circumferential surface thereof, a position part consisting of a  
5 groove along the circumferential surface thereof and located at a predetermined  
distance from a center of a combination side, and a cylindrical concave part located  
on a back of the combination side;  
a tag circuit located in the position part of the first preform;  
a second preform provided with convex and concave parts formed in a  
10 saw tooth shape on a circumferential surface thereof, and a cylindrical concave  
part located on a back of a combination side, said second preform combined with  
the first preform at the combination side; and  
a final formed part covering the cylindrical concave part located on each  
preform.
- 15 2. The casino chip according to claim 1, further comprising protrusions  
located on the combination side of the first preform and holes located on the  
combination side of the second preform.
3. The casino chip according to claim 1, further comprising a position part  
located on the combination side of the second preform.
- 20 4. The casino chip according to claim 2, further comprising adiabatic  
members inserted into the position part located between each preform and a tag  
circuit.
5. The casino chip according to claim 2, further comprising packing  
members each inserted into a cylindrical space part located on a center of each  
25 preform.

11

6. A method of manufacturing a casino chip with an antitheft and antiforgery tag circuit, comprising the steps of:

preliminary injection molding preforms so that the preforms are combined with each other to form an integrated body;

5            inserting a tag circuit into a position part located on each preform;  
             combining the preforms having the tag circuits with each other; and  
             insert-injection molding the combined preforms using a mold.

7. The method according to claim 6, wherein a plurality of preforms engage with each other in the combining step.

10           8. The method according to claim 6, further comprising the step of  
inserting an adiabatic member into the position part of each preform after the  
preliminary injection molding step and before the inserting step.

9. The method according to claim 8, wherein a plurality of preforms are welded to each other by an ultrasonic wave in the combining step.

15           10. A method of manufacturing a casino chip with an antitheft and  
antiforgery tag circuit, comprising the steps of:

preliminary injection molding of preforms so that the preforms are  
combined with each other to form an integrated body, each of said preforms having  
a space part capable of receiving a packing member and located on a center thereof,  
20        said packing member made of a different material from the preform;

             inserting a tag circuit into a position part located on each preform;  
             inserting the packing member into the space part of each preform;  
             combining the preforms having the tag circuits and the packing members  
with each other; and

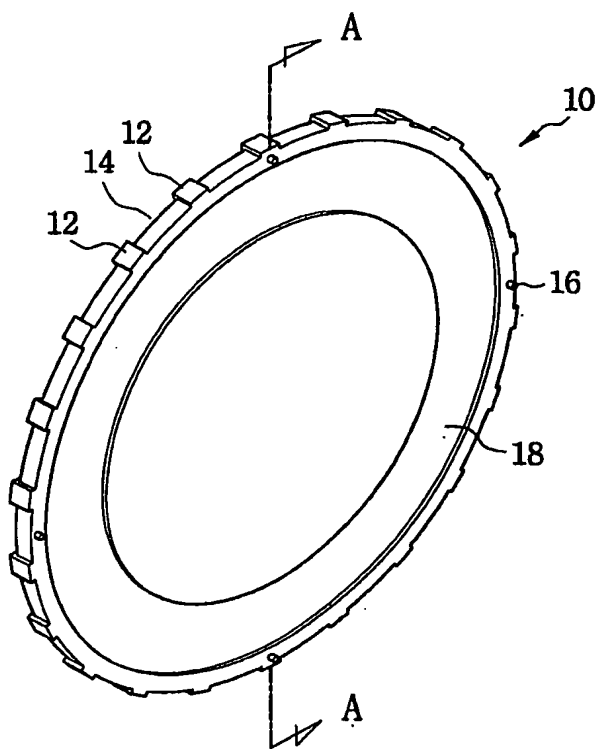
25           insert-injection molding the combined preforms using a mold.

11. The method according to claim 10, wherein the packing member is

composed of substances selected from the group consisting of high specific gravity plastics, ceramics, glasses, and stone plates.

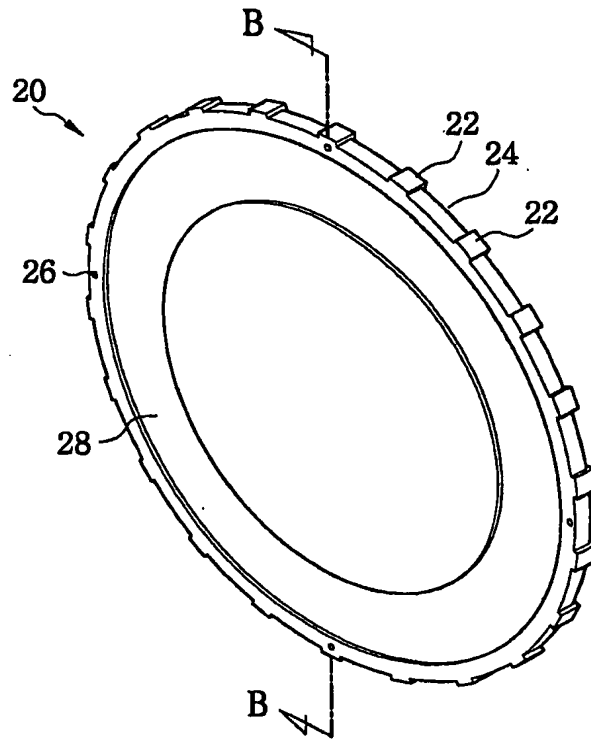
12. The method according to any one of claims 6 to 11, wherein a color of the preform produced by the preliminary injection molding step is different from  
5 that of the casino chip produced by the insert-injection molding step.

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Fig. 1



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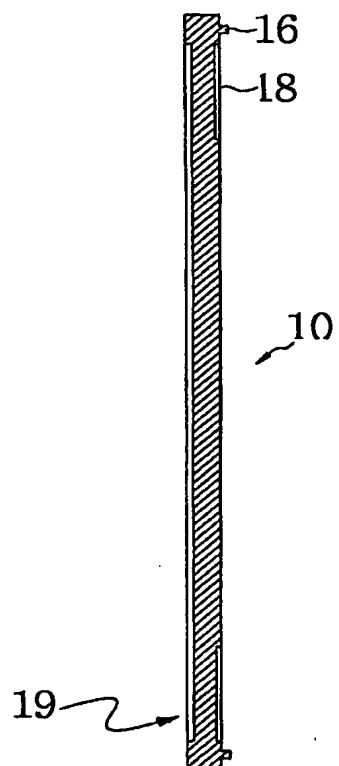
Fig. 2





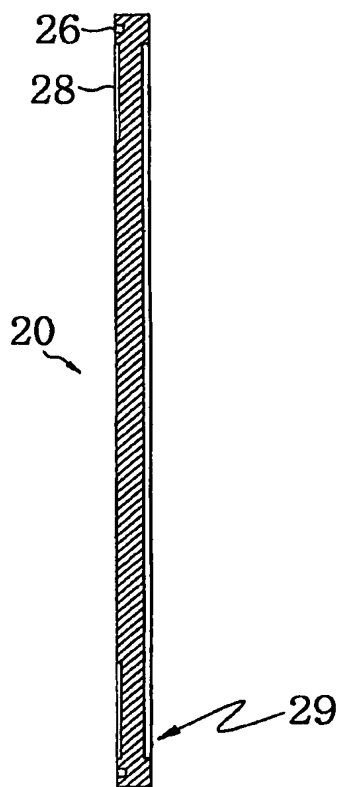
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Fig. 3



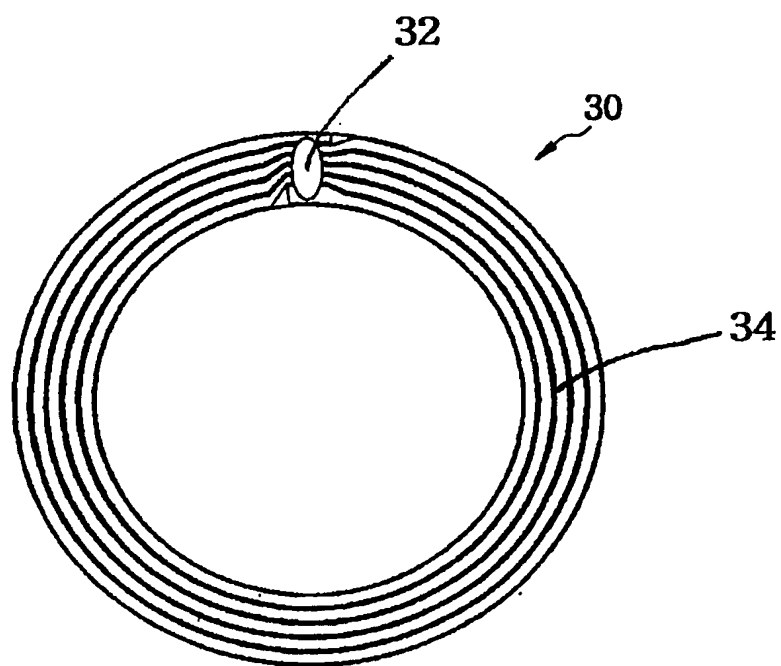
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Fig. 4



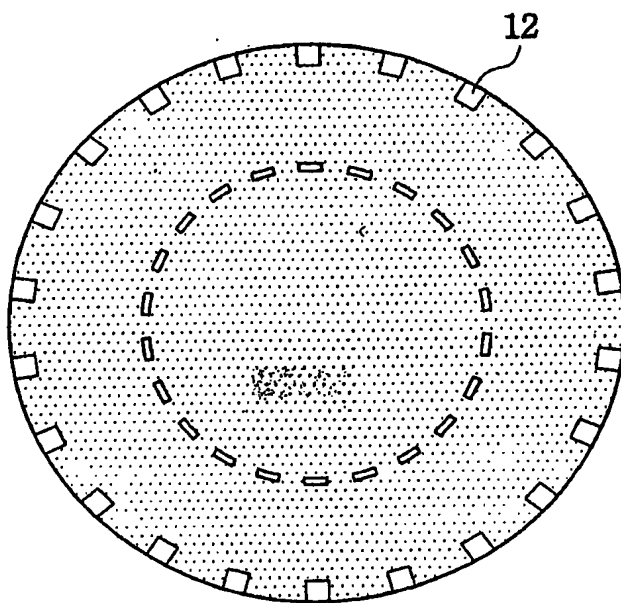
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Fig. 5



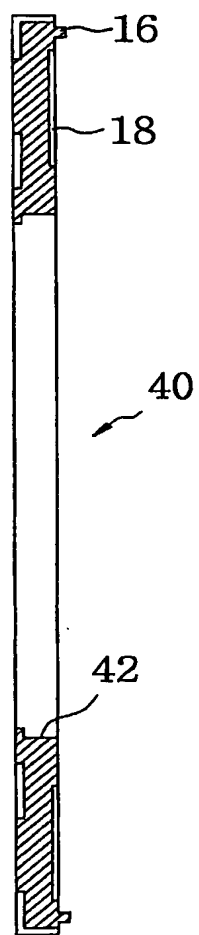
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Fig. 6



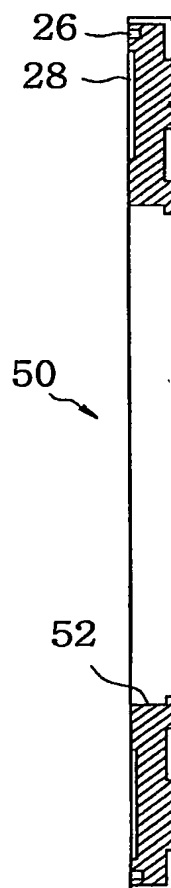
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Fig. 7



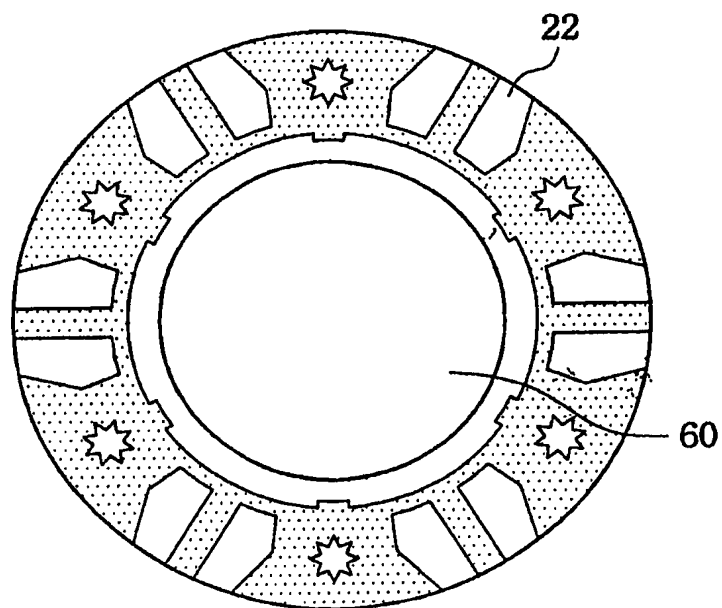
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Fig. 8



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Fig. 9



# INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR02/00743

## A. CLASSIFICATION OF SUBJECT MATTER

IPC7 B29C 45/14, A44C 21/00, A63F 1/06, G07D 5/08, G07F 1/06, G08B 13/24, G09F 3/02

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7 B29C 45/14, A44C 21/00, A63F 1/06, G07D 5/08, G07F 1/06, G08B 13/24, G09F 3/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Patents and applications for inventions since 1975

Korean Utility models and applications for Utility models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

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## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5895321 A (Gassies et al.) 20 April 1999 (20.04.1999) See the whole document	1-12
A	US 3953932 A (Graves) 04 May 1976 (04.05.1976) See the whole document	1-12
A	EP 0436497 A2 (Rendleman, Thomas G.) 10 July 1991 (10.07.1991) See the whole document	1-12
A	US 3983646 A (Howard) 05 October 1976 (05.10.1976) See the whole document	1-12
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☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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# INTERNATIONAL SEARCH REPORT

International application No.

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